

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1 **Claim 1 (currently amended):** A semiconductor chip pick-up
2 method for picking up a semiconductor chip adhered to a sheet by
3 using a pick-up head, comprising:

4 a sheet exfoliating step for abutting a suction surface of a
5 sheet exfoliation mechanism against a lower surface of the sheet
6 and for performing vacuum-sucking through the suction surface
7 thereby to exfoliate the sheet from the semiconductor chip; and

8 a sucking and holding step of sucking and holding an upper
9 surface of the semiconductor chip thus exfoliated from the sheet
10 by the pick-up head thereby to pick up the semiconductor chip,
11 wherein

12 in the sheet exfoliating step, when the vacuum-sucking is
13 performed through the suction surface, the semiconductor chip
14 adhered to the sheet is bent and deformed by a vacuum suction
15 force in an almost same bent shape in a continuous bent range
16 from an outer peripheral portion of one side of the chip to an
17 outer peripheral portion of another one side of the chip thereby
18 to exfoliate the sheet from a lower surface of the semiconductor
19 chip.

1 **Claim 2 (original):** A semiconductor chip pick-up method
2 according to claim 1, wherein the semiconductor chip bends and
3 deforms in a plurality of the bent ranges.

1 **Claim 3 (original):** A semiconductor chip pick-up method
2 according to claim 1, wherein the semiconductor chip is
3 configured in a rectangular shape, and the bent range is set in a
4 direction which forms a predetermined angle with respect to one
5 side of the semiconductor chip.

1 **Claim 4 (original):** A semiconductor chip pick-up method
2 according to claim 3, wherein the bent range includes a corner
3 portion of the semiconductor chip.

1 **Claim 5 (original):** A semiconductor chip pick-up apparatus
2 for picking up a semiconductor chip adhered to a sheet by using a
3 pick-up head, comprising:

4 a holding table for holding the sheet; and

5 a sheet exfoliation mechanism which is disposed beneath the
6 holding table, a suction surface of the sheet exfoliation
7 mechanism being abutted against a lower surface of the sheet to
8 perform vacuum sucking through the suction surface thereby to
9 exfoliate the sheet from the semiconductor chip,

10 wherein the suction surface includes a plurality of suction
11 grooves and a boundary portion which partitions the adjacent
12 suction grooves, the boundary portion is abutted against the

13 lower surface of the sheet to support the sheet at a time of the
14 vacuum sucking, and air is vacuum-sucked from the suction grooves
15 to bend and deform the semiconductor chip adhered to the sheet
16 together with the sheet thereby to exfoliate the sheet from a
17 lower surface of the semiconductor chip due to the bend
18 deformation.

1 **Claim 6 (original):** A semiconductor chip pick-up apparatus
2 according to claim 5, wherein the semiconductor chip is supported
3 by the plurality of boundary portions through the sheet.

1 **Claim 7 (original):** A semiconductor chip pick-up apparatus
2 according to claim 5, wherein the semiconductor chip is
3 configured in a rectangular shape, and each of the suction
4 grooves is provided in a direction which forms a predetermined
5 angle with respect to one side of the rectangular-shaped
6 semiconductor chip.

1 **Claim 8 (original):** A semiconductor chip pick-up apparatus
2 according to claim 7, wherein the suction grooves are arranged in
3 a manner that corner portions of the semiconductor chip are not
4 positioned just above the boundary portions when the suction
5 surface is abutted against the lower surface of the sheet.

1 **Claim 9 (original):** A semiconductor chip pick-up apparatus
2 according to claim 5, wherein the suction grooves are provided at
3 a suction exfoliation tool, and the suction exfoliation tool is
4 attached to the sheet exfoliation mechanism so as to be exchanged
5 freely.

1 **Claim 10 (original):** A suction exfoliation tool for use in
2 a semiconductor chip pick-up apparatus for picking up a
3 semiconductor chip adhered to a sheet by using a pick-up head,
4 comprising:

5 a suction exfoliation tool to be attached to a sheet
6 exfoliation mechanism which has a suction surface being abutted
7 against a lower surface of the sheet to perform vacuum sucking
8 through the suction surface thereby to exfoliate the sheet from
9 the semiconductor chip,

10 wherein the suction surface provided at the suction
11 exfoliation tool includes a plurality of suction grooves and a
12 boundary portion which partitions the adjacent suction grooves,
13 the boundary portion is abutted against the lower surface of the
14 sheet to support the sheet at a time of the vacuum sucking, and
15 air is vacuum-sucked from the suction grooves to bend and deform
16 the semiconductor chip adhered to the sheet together with the
17 sheet thereby to exfoliate the sheet from a lower surface of the
18 semiconductor chip due to the bend deformation.

1 **Claim 11 (currently amended):** A semiconductor chip pick-up
2 method for picking up a semiconductor chip adhered to a sheet by
3 using a pick-up head, comprising the steps of:
4 abutting a suction surface of a sheet exfoliation mechanism
5 against a lower surface of the sheet;
6 performing vacuum-sucking through the suction surface
7 thereby to exfoliate the sheet from the semiconductor chip, the
8 semiconductor chip adhered to the sheet being bent and deformed
9 by a vacuum suction force in an almost same bent shape in a
10 continuous bent range from an outer peripheral portion of one
11 side of the chip to an outer peripheral portion of another one
12 side of the chip thereby to exfoliate the sheet from a lower
13 surface of the semiconductor chip; and
14 picking up the semiconductor chip by sucking and holding an
15 upper surface of the semiconductor chip by the pick-up head.